are practically wholly due. Part II ("The Transcendental Functions") is, as we should expect, most admirably done; but, since the subject-matter is exclusively technical, the philosopher and logician will turn with more interest to those chapters in Part I ("The Processes of Analysis") in which more fundamental subjects are discussed. It is a most pleasing fact that the treatment of irrational numbers (pp. 4-6), the theory of convergence (pp. 11-40), and the proof of the theorem of Cauchy and Goursat on complex integration (pp. 53-54, 84-87) by the help of the "modified Heine-Borel theorem," are so well done in this new edition. The theorem attributed to Bolzano (p. 13) was not really proved by Bolzano. Bolzano used, in 1817 and not in 1851 as stated, the same *process* which afterwards, in the hands of Weierstrass, led to an exact proof. The exact proof of the condition mentioned on page 14 is also due to Weierstrass and not to Cauchy. The book is a thoroughly good one, and will be of great value in English and American universities. Φ

FUNDAMENTAL CONCEPTIONS OF MODERN MATHEMATICS. By *Robert P. Richardson* and *Edward H. Landis.* Chicago: The Open Court Publishing Co., 1915. Cloth, $1.25 net.

This work deals, not with the technicalities of mathematics or with its applications as an art, but with a basis for its scientific development. In considering mathematics as a science rather than as an art two points of view may be taken. With the first, that of pure formalism, the scope of the investigation hardly goes beyond symbols and the laws of their combination, little heed being paid to what these symbols represent. The prevailing tendency is to look at mathematical science in just this aspect, but the authors of the present work, preferring a broader outlook, have chosen the second viewpoint where attention is focussed upon the subject matter of the science, the form in which this is symbolically expressed being regarded as of minor importance. They are not content to rest satisfied with a science of symbols, but inquire into the realities underlying mathematical formulas. Naturally a primary object of the quest is to furnish a clear and precise explanation of the nature of the various types of quantities represented by the symbols of mathematics. This cannot be satisfactorily done by merely giving a résumé of doctrines already current, for the field of inquiry here was largely virgin soil and much original work was necessary to attain a theory that accorded with mathematical practice. The account given of quantities and their classification goes into the matter with great detail, and has in view not merely the quantities of ordinary algebra but likewise those of quaternions and of all other branches of algebraic science. Equally thorough is the consideration given to the constitution of variables and the essential characteristics of a functional relation between variables. Besides these three main topics the discussion takes up a number of other questions, minor ones relatively speaking but of no small importance to the theory of mathematics. The book, which has as subtitle *Variables and Quantities with a Discussion of the General Conception of Functional Relation,* is the first of a series projected to cover all the fundamental conceptions of modern mathematics, but it is a complete work in itself, and the questions that come within its scope are by far the most fundamental of all arising in mathematical science.